

	A	B	C	D	E	F	G	H	I	J	K	L
1	<b>Background Statistics for Data Sets with Non-Detects</b>											
2	<b>User Selected Options</b>											
3	Date/Time of Computation			10/22/2015 2:50:45 PM								
4	From File			WorkSheet.xls								
5	Full Precision			OFF								
6	Confidence Coefficient			95%								
7	Coverage			95%								
8	Different or Future K Observations			1								
9	Number of Bootstrap Operations			2000								
10												
11	<b>HxCDF</b>											
12												
13	<b>General Statistics</b>											
14	Total Number of Observations				31		Number of Missing Observations				0	
15	Number of Distinct Observations				30							
16	Number of Detects				18		Number of Non-Detects				13	
17	Number of Distinct Detects				18		Number of Distinct Non-Detects				12	
18	Minimum Detect				3.3000E-5		Minimum Non-Detect				9.7600E-6	
19	Maximum Detect				2.4000E-4		Maximum Non-Detect				1.0900E-4	
20	Variance Detected				3.5251E-9		Percent Non-Detects				41.94%	
21	Mean Detected				1.1987E-4		SD Detected				5.9373E-5	
22	Mean of Detected Logged Data				-9.164		SD of Detected Logged Data				0.563	
23												
24	<b>Critical Values for Background Threshold Values (BTVs)</b>											
25	Tolerance Factor K (For UTL)				2.197		d2max (for USL)				2.76	
26												
27	<b>Normal GOF Test on Detects Only</b>											
28	Shapiro Wilk Test Statistic				0.956		<b>Shapiro Wilk GOF Test</b>					
29	5% Shapiro Wilk Critical Value				0.897		Detected Data appear Normal at 5% Significance Level					
30	Lilliefors Test Statistic				0.122		<b>Lilliefors GOF Test</b>					
31	5% Lilliefors Critical Value				0.209		Detected Data appear Normal at 5% Significance Level					
32	<b>Detected Data appear Normal at 5% Significance Level</b>											
33												
34	<b>Kaplan Meier (KM) Background Statistics Assuming Normal Distribution</b>											
35	Mean				7.6680E-5		SD				6.8161E-5	
36	95% UTL95% Coverage				2.2643E-4		95% KM UPL (t)				1.9422E-4	
37	90% KM Percentile (z)				1.6403E-4		95% KM Percentile (z)				1.8880E-4	
38	99% KM Percentile (z)				2.3525E-4		95% KM USL				2.6477E-4	
39												
40	<b>DL/2 Substitution Background Statistics Assuming Normal Distribution</b>											
41	Mean				7.9577E-5		SD				6.6441E-5	
42	95% UTL95% Coverage				2.2555E-4		95% UPL (t)				1.9415E-4	
43	90% Percentile (z)				1.6472E-4		95% Percentile (z)				1.8886E-4	
44	99% Percentile (z)				2.3414E-4		95% USL				2.6292E-4	
45	<b>DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons</b>											
46												
47	<b>Gamma GOF Tests on Detected Observations Only</b>											
48	A-D Test Statistic				0.295		<b>Anderson-Darling GOF Test</b>					
49	5% A-D Critical Value				0.743		Detected data appear Gamma Distributed at 5% Significance Level					
50	K-S Test Statistic				0.114		<b>Kolmogrov-Smirnoff GOF</b>					

	A	B	C	D	E	F	G	H	I	J	K	L	
51	5% K-S Critical Value				0.205	Detected data appear Gamma Distributed at 5% Significance Level							
52	<b>Detected data appear Gamma Distributed at 5% Significance Level</b>												
53													
54	<b>Gamma Statistics on Detected Data Only</b>												
55	k hat (MLE)				3.854	k star (bias corrected MLE)				3.248			
56	Theta hat (MLE)				3.1106E-5	Theta star (bias corrected MLE)				3.6902E-5			
57	nu hat (MLE)				138.7	nu star (bias corrected)				116.9			
58	MLE Mean (bias corrected)				1.1987E-4								
59	MLE Sd (bias corrected)				6.6509E-5	95% Percentile of Chisquare (2k)				13.33			
60													
61	<b>Gamma ROS Statistics using Imputed Non-Detects</b>												
62	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs												
63	GROS may not be used when kstar of detected data is small such as < 0.1												
64	For such situations, GROS method tends to yield inflated values of UCLs and BTVs												
65	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates												
66	Minimum				3.3000E-5	Mean				0.00426			
67	Maximum				0.01	Median				1.8500E-4			
68	SD				0.00496	CV				1.163			
69	k hat (MLE)				0.371	k star (bias corrected MLE)				0.357			
70	Theta hat (MLE)				0.0115	Theta star (bias corrected MLE)				0.012			
71	nu hat (MLE)				23.01	nu star (bias corrected)				22.12			
72	MLE Mean (bias corrected)				0.00426	MLE Sd (bias corrected)				0.00714			
73	95% Percentile of Chisquare (2k)				3.083	90% Percentile				0.0123			
74	95% Percentile				0.0184	99% Percentile				0.0341			
75	<b>The following statistics are computed using Gamma ROS Statistics on Imputed Data</b>												
76	<b>Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods</b>												
77					WH	HW					WH	HW	
78	95% Approx. Gamma UTL with 95% Coverage				0.0279	0.0339	95% Approx. Gamma UPL				0.0183	0.0204	
79	95% Gamma USL				0.0432	0.0575							
80													
81	<b>The following statistics are computed using gamma distribution and KM estimates</b>												
82	<b>Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods</b>												
83	k hat (KM)				1.266	nu hat (KM)				78.47			
84					WH	HW					WH	HW	
85	95% Approx. Gamma UTL with 95% Coverage				3.2255E-4	3.5618E-4	95% Approx. Gamma UPL				2.3802E-4	2.5241E-4	
86	95% Gamma USL				4.4670E-4	5.1801E-4							
87													
88	<b>Lognormal GOF Test on Detected Observations Only</b>												
89	Shapiro Wilk Test Statistic				0.952	<b>Shapiro Wilk GOF Test</b>							
90	5% Shapiro Wilk Critical Value				0.897	Detected Data appear Lognormal at 5% Significance Level							
91	Lilliefors Test Statistic				0.122	<b>Lilliefors GOF Test</b>							
92	5% Lilliefors Critical Value				0.209	Detected Data appear Lognormal at 5% Significance Level							
93	<b>Detected Data appear Lognormal at 5% Significance Level</b>												
94													
95	<b>Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects</b>												
96	Mean in Original Scale				8.2821E-5	Mean in Log Scale				-9.676			
97	SD in Original Scale				6.3071E-5	SD in Log Scale				0.754			
98	95% UTL95% Coverage				3.2951E-4	95% BCA UTL95% Coverage				2.4000E-4			
99	95% Bootstrap (%) UTL95% Coverage				2.4000E-4	95% UPL (t)				2.3067E-4			
100	90% Percentile (z)				1.6515E-4	95% Percentile (z)				2.1723E-4			

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101				99% Percentile (z)		3.6326E-4					95% USL	5.0368E-4
102												
103	<b>Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution</b>											
104				KM Mean of Logged Data		-10.05				95% KM UTL (Lognormal)	95% Coverage	5.8898E-4
105				KM SD of Logged Data		1.187				95% KM UPL (Lognormal)		3.3606E-4
106				95% KM Percentile Lognormal (z)		3.0577E-4				95% KM USL (Lognormal)		0.00115
107												
108	<b>Background DL/2 Statistics Assuming Lognormal Distribution</b>											
109				Mean in Original Scale		7.9577E-5				Mean in Log Scale		-9.866
110				SD in Original Scale		6.6441E-5				SD in Log Scale		1.028
111				95% UTL		95% Coverage				95% UPL (t)		3.0594E-4
112				90% Percentile (z)		1.9401E-4				95% Percentile (z)		2.8190E-4
113				99% Percentile (z)		5.6819E-4				95% USL		8.8711E-4
114	<b>DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.</b>											
115												
116	<b>Nonparametric Distribution Free Background Statistics</b>											
117	<b>Data appear to follow a Discernible Distribution at 5% Significance Level</b>											
118												
119	<b>Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)</b>											
120				Order of Statistic, r		31				95% UTL with	95% Coverage	2.4000E-4
121				Approximate f		1.632				Confidence Coefficient (CC) achieved by UTL		0.796
122				95% UPL		2.1060E-4				95% USL		2.4000E-4
123				95% KM Chebyshev UPL		3.7854E-4						
124												
125	Note: The use of USL to estimate a BTV is recommended only when the data set represents a background											
126	data set free of outliers and consists of observations collected from clean unimpacted locations.											
127	The use of USL tends to provide a balance between false positives and false negatives provided the data											
128	represents a background data set and when many onsite observations need to be compared with the BTV.											
129												